

MyStationPerformance.Com

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Abstract: There is a need for standardized; more comprehensive; easily accessible and current ILRS network performance feedback as the ILRS strives toward mm level reliability and accuracy.

Currently, many ILRS sites have limited on-site data assessment capabilities. At some locations, system problems (e.g. equipment problems, data instability, large biases, insufficient data) linger for prolonged periods of time. Conflicting bias information from different analysis centers can also complicate and delay problem resolution.

*Our recommended solution to these challenges is the development of a new service, **MyStationPerformance.Com**.*

Introduction:

MyStationPerformance.Com is a concept and not a URL. The concept is based on other customized web sites that have appeared over the past few years (e.g. myYahoo.com, myHoneywell.com, etc.).

The key features of **MyStationPerformance.Com** will be:

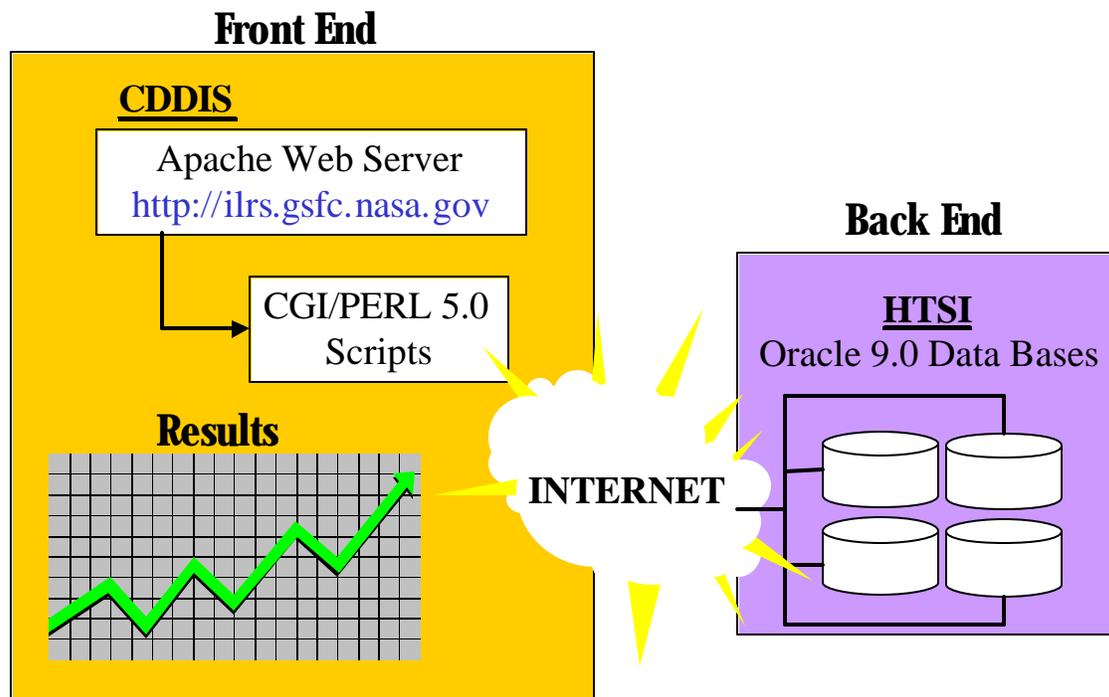
- Web-based
- Dynamic - near real time aggregate analysis (short and long term)
- Comprehensive (i.e. data quantity, RMS stability, bias stability)
- Graphical
- User Friendly
- Interactive
- Artificial Intelligence

The primary customer of this service will be the ILRS sites (i.e. station operators and their engineering support). Utilizing this service, sites can expedite the diagnosis of their performance problems, thereby facilitating a rapid resolution and return to acceptable performance. The ILRS analyst community can also use this tool to confirm a station performance problem.

Computer and Software Architecture:

Below in Figure 1 is a schematic of the computer and software infrastructure in support of this project.

Figure 1: Computer and Software Architecture



Interface and Examples:

The prime interface for **MyStationPerformance.Com** will be pull-down menus, which will reside on the existing ILRS web site on the Crustal Dynamics Data Information System (CDDIS). In the background, there will be CGI/PERL scripts, which will access ORACLE databases resident either on the HTSI mission operations computer or the CDDIS.

Below are the databases to be used in station assessment:

1. Normal point data base
 - a) On-site processing statistics (RMSs, system delay, full-rate observation, etc.)
 - b) Meteorological Data
 - c) Data Latency
2. Bias reports (LAGEOS, GPS, LEOs)
3. BEST Calibration Practices
4. Symptoms/causes of performance problems
5. Site Logs
6. SLR Data Corrections

From the main page of the [MyStationPerformance.Com](https://www.mystationperformance.com), you will choose the site from a pull-down menu and then make one of the following choices from a list of performance categories:

1. My Performance Metrics
2. My Performance Symptoms/Causes
3. My BEST Practices
4. My Site Information
5. My Responsibilities

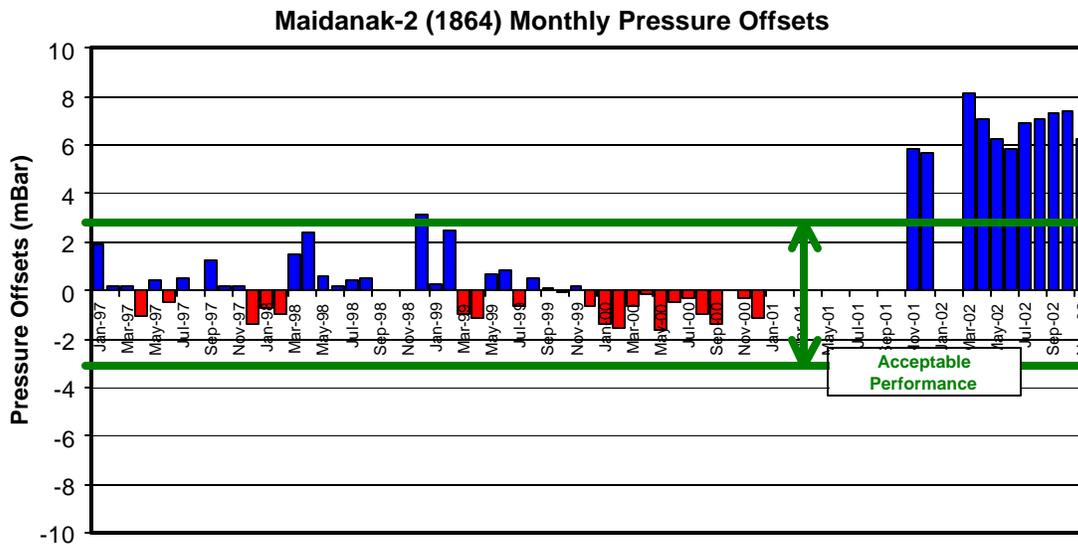
Once you select from one of the above, you can interactively choose additional menu-driven choices. For example if you select My Metrics, then the next election would be the satellite(s). The choice after that would be the performance category (e.g. data volume, RMSs, meteorological data).

Let's look at how **MyStationPerformance.Com** will work and the thought processes involved in making selections. Let's assume you are either the Maidanak-2 station or a data analyst interested in a time history of barometric pressures from this location. Below would be the choices you would make in this example. (selections are highlighted in **purple bold italics**).

1. My Site: ***Maidanak-2***
 - a. My Site Category: ***My Metrics***
 - i. My Satellites: ***All***
 1. My Performance Metrics: ***Meteorological Data***
 - a. My Met. Data Category: ***Pressure***
 - i. My Chart: ***Monthly Time Series***

After you have made the above choices, the following chart (Figure 2) would be generated in the background and displayed:

Figure 2: Maidanak Barometric Performance



It appears something happened to the Maidanak-2 barometric readings at the end of 2001. In reality, the barometric sensor was replaced in 2001 and the earlier sensor is believed to be in error by approximately -6 millibars.

Let's look at one example on performance symptoms and causes. For this example, we will assume you are the Greenbelt site and you would like to know why your range bias on a given pass is "OFF THE CHARTS", while subsequent data appears nominal. Below would be the choices you would make in this example (selections are highlighted in *purple bold italics*).

1. My Site: *Greenbelt*
 - a. My Site Category: *My Performance Symptoms/Causes*
 - i. Symptom: *Excessive Range Bias (i.e. >5Km)*
 1. Calibration RMS nominal (Yes/No): *Yes*
 2. System delay nominal (Yes/No): *Yes*
 3. Was subsequent data OK (Yes/No): *Yes*
 4. Was this a daylight pass (Yes/No): *No*
 5. Was this pass near midnight (yes,No): *Yes*

After you have made the above choices, the following "cause" would be generated in the background and displayed:

The cause of the excessive Greenbelt range bias was a midnight crossing procedural problem. Please check the date stamp of your normal points.

We will look at one last example on BEST practices. For this example, we will assume you are the Potsdam site and you are interested in the BEST practices for your new SR620 time interval unit. Below would be the choices you would make in this example. (selections are highlighted in *purple bold italics*).

1. My Site: *Potsdam*
 - a. My Site Category: *My BEST Practices*
 - i. Major Sub-System: *Timing*
 1. Sub Sub-System: *Counter*
 - a. Counter Manufacturer & Model: *SR620*

After you have made the above choices, the following “BEST Practices” would be generated in the background and displayed [Gibbs, 2002]:

1. Power supply:

Never switch off. If it has been turned off, allow at least 1 hour for warm up. Use a stable mains voltage supply. Monitor this voltage regularly. Use a transient suppressor to prevent voltage "spikes" reaching the timer.

2. Environmental Control:

Maintain a stable temperature environment and airflow around the timer. Monitoring the temperatures of air at the timer air inlet and outlet.

3. Signal integrity:

Use only high-quality cables and connectors. Take great care with shielding and grounding in order to make sure that all noise sources are minimized.

4. External frequency ("Clock source"):

Supply each timer with a separate, high quality 10 MHz sine wave. Keep it permanently connected to the timer. Make sure that the timer is set up to take an external "clock source". Make sure that the input is properly terminated with a 50 Ohm impedance via a standard BNC T-connector.

5. Jitter:

Monitor the jitter of the timer at least monthly.

6. Non-linearity:

If you have more than one timer regularly, monitor the range dependence of time interval measurements. As an independent check data may be collected over the full range of satellite ranges by exposing the detector to (reduced) daylight and successively gating at different ranges using a time delay generator.

7. Level settings:

Setting the discriminator levels for input pulses using the hand controls on the front panel does not give consistent or reproducible values for these settings. Best results are obtained by using the hand controls to set values far different from (preferably with the opposite sign) those required for the inputs actually to be used, and then setting the required values from software.

Summary and Conclusions:

This is an ambitious project that will be rolled out in phases. The 1st phase of this project will be limited to static canned performance parameters (e.g. satellite RMS, calibration RMS, data quantity and system delay). This success of this project will depend in part on the support provided by the ILRS Networks and Engineering Working Group especially in the area of BEST practices and Performance Symptoms/Causes. Regular updates on the status of the project will be presented at upcoming ILRS meetings and workshops. MyStationPerformance.Com should NOT be a replacement for on-site station diagnostics and system characterization tests [*Pearlman, 1984*].

References:

Gibbs P., 2002, "Inter-comparison of various timing devices against a single SR timer", Proceedings of the 13th International Laser Ranging Workshop, Washington DC, USA.

Pearlman M., 1984, "Laser System Characterization", Proceedings of the Fifth International Workshop on Laser Ranging Instrumentation, Herstmonceux, U.K. p 66.